

# **System and Method for Mixing Fingernail Polish**

## **FIELD OF THE INVENTION**

**[001]** The present invention relates generally to a system and method for mixing fingernail polish. More specifically, the present invention relates to a system and method for mixing and or re-homogenizing fingernail polish within the retail package or bottle before its initial use and more commonly before subsequent uses.

## **BACKGROUND OF THE INVENTION**

**[002]** Over time, most fingernail polish solutions or suspensions tend to separate into various phases according to the specific gravities of the constituents which have been combined to formulate said solutions or suspensions, thereby requiring re-homogenizing or mixing to achieve their intended consistency prior to use.

**[003]** Generally fingernail polish is mixed by means of manual agitation in a back and forth or up and down movement of the hand with the bottle closed and held between the thumb and fingers of the hand being moved. This relatively uncontrolled and subjective manual mixing action, often leads to the formation of small bubbles within the polish, which cause undesirable effects on the surface finish after drying as well as difficulties in application.

**[004]** In the professional arena of nail care there remains a clear need for a system and method by which the nail technician can evenly and consistently mix bottles of fingernail polish many times each hour without suffering the ergonomic stress of repeated manual mixing motions.

## **DESCRIPTION OF THE PRIOR ART**

**[005]** While the prior art listed below demonstrates a myriad of different methods for mixing paints and cosmetics, those in the art will appreciate the unique applications embodied within the present invention.

**[006]** US Pat. No. 5,778,901 issued July 14, 1998, to Sandra L. Abrahamian, describes a nail polish kit for mixing custom solutions by a plurality of pigments.

**[007]** US Pat. No. 4,714,084 issued Dec 22, 1987, to a Craig Berry & Marc Bennett, describes a method for simultaneously applying and blending cosmetics.

**[008]** US Pat. No. 5,322,358 issued June 21, 1994, to Denise Coho & Eddy Peiffer, describes a portable cosmetic shaker.

**[009]** US Pat. No. 4,842,415 issued June 27, 1998, to Michael R. Cane & Michael H. Groves, describes a paint shaker for in-store paint tinting.

**[010]** US Pat. No. 4,497,581 issued Feb 5, 1985 to Herbert L. Miller, describes a paint shaker for agitating and mixing paint and the like.

**[011]** US Pat. No. 4,422,768 issued Dec 27, 1983 to Donald F. Solomon, describes a paint can shaker which includes springs acting between the frame and a supporting surface to enable the carrier to undergo rolling vibratory motion relative to the supporting surface.

**[012]** It is understood that there are many methods available for the mixing of paints, lacquers, enamels, and liquid acrylics such as fingernail polish, however those methods are generally for large quantities and are unsuitable for mixing a small single bottle of solution and are designed to produce violent actions within solutions which are unsuitable for the mixing of fingernail polish in as much as the introduction of air bubbles is undesirable.

Available units are have either been designed for broad and generic across the board mixing applications such as cosmetics in general or paints in general but fail to address the specific requirements needed to correctly remix fingernail polish prior to its application to the fingernail. While some available units could be useful in a commercial setting, these units are impractical for home and or personal use based upon size, complexity, lack of portability and increased cost.

**[013]** Therefore, there remains a need for a controlled and automatic system of consistent and even mixing or homogenizing fingernail polish within the retail bottle before each use, which does not cause or tend to introduce excessive air or gas bubble formations within the said fingernail polish suspension through violent agitation. There further remains a need for a system and method as mentioned above that is cost effective to produce and offer in the retail and personal appliance market.

### **BRIEF SUMMARY OF THE INVENTION**

**[014]** The present invention provides a system and method for mixing or homogenizing fingernail polish while inside its original retail bottle, before the first usage as well as before each subsequent use. The current invention further provides for a method mixing and or homogenizing which minimizes the formation of undesirable bubbles within the solution during the mixing operation.

**[015]** The system of the present invention generally comprises five main components: a first component, the *frame*, to provide for a structural body in which the mechanism may operate, a second component, the *elastomeric mixing platform* to control the gyration of

the fingernail polish bottle during mixing, and a third component, the *cycle trigger* for triggering or starting the mixing cycle upon bottle insertion, a fourth component, the *cycle timer logic* for controlling length of the mixing operation and a fifth component, a structural non-skid base within which the batteries and electronics are stored. These terms are used as reference terms only and are not intended to be descriptive or limiting.

**[016]** The *frame* is comprised of a cylinder with structural support beams running down the inside wall of the cylinder which allow for the mounting of the mixing mechanism concentric to and within the said cylinder.

**[017]** The *elastomeric mixing platform* component comprises the *work piece holding device*, the *motor plate* and the *motor*. The *work piece holding device* comprises a cylindrical plug of polystyrene foam with a specially designed oval shaped cavity cut from the center of the plug along the cylindrical axis so as to form an oval hollow center through the plug from top to bottom. The specially designed oval cutout is shaped in such a way as to accept the reasonable insertion of the vast majority of retail fingernail polish bottle shapes while maintaining sufficient elasticity to keep the bottle secure while mixing. The *work piece holding device* is fixed to the top surface of the *motor plate*. The *motor plate*, for the purpose of description we will say, is a round disc with four anchor points located near or along its outer perimeter by which the plate is suspended along a plane by elastic bands stretched along the same plane or parallel to the plate's top surface with their opposing ends being anchored to the larger diameter of the *frame component*; said *motor plate* also having a small rotating *motor* mounted so that the rotating shaft of the *motor* is perpendicular to and beneath the *motor plate's* flat planar top surface. Said *motor* having an offset weight mounted on its rotating shaft as to cause gyration about the perpendicular

centerline axis while the *motor* shaft is rotating. The *work piece holding device*, aside from holding the bottle of fingernail polish, also acts as a *physical travel limiting and dampening control* which limits the formation of undesirable air bubbles during the mixing operation by dampening the inherently violent gyrations created by the wobbling motor.

**[018]** The *cycle trigger* component comprises a magnetic reed switch mounted below the *elastomeric mixing platform* on the frame body and a permanent magnet mounted to the under-side of the *elastomeric mixing platform* so that when the platform is pushed down by the insertion of a bottle of fingernail polish it causes the magnet to move sufficiently close to the magnetic reed switch to actuate that magnetic reed switch momentarily causing a closed electrical current path which in turn causes the mixing cycle to be initiated.

**[019]** In one embodiment the *cycle timer* component is an electronic circuit referred to in the art as a one-shot timer circuit which provides a means for a repeatable fixed time duration current supply to be applied to the counter-weighted rotating electric motor on the *elastomeric mixing platform*, causing it to rotate for a fixed time duration after having received a momentary current or voltage trigger from the *cycle trigger* component. In still another embodiment, the *electronic cycle timer* also reverses the rotational direction of the mixing motor one or more times during the mixing cycle.

## **BREIF DECSRIPTION OF THE DRAWINGS**

**[020]** The detailed description that follows offers features, objects, and advantages apparent in the present invention. It should be understood, however, that the detailed description, while indicating preferred embodiments of the invention, are given by way of

illustration only, not limitation. Various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from the detailed description.

**[021]** Various other objects, features and attendant advantages of the present invention will become fully appreciated as the same becomes better understood when considered in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the several views. These drawings are provided for illustration, not limitation.

**[022]** Figure 1A illustrates an Exploded Wire-frame View of the present invention, which also includes a callout of the motor plate assembly Fig 1B.

**[023]** Figure 2 illustrates a wire-frame perspective drawing of the *elastomeric mixing platform*.

**[024]** Figure 3 illustrates a solid Cut Away View of the present invention.

**[025]** Figure 4 illustrates a perspective view of a fully assembled unit.

## DETAILED DESCRIPTION

[026] The present invention provides a system and method for mixing and or homogenizing bottles of fingernail polish so as to present them for immediate use and application by performing said mixing without introducing the air bubbles into the nail polish solution which so commonly cause surface finish problems during and after application when mixed manually.

[027] As seen in Figure 1A, the system of the present invention generally comprises the following components: a first component comprising the *upper, outer frame and body* 10, with *mounting holes* 11, for the *elastic support bands* 12, which support the *work piece holding device* 20 and motor plate 30, the *motor* 40, is attached to the underside of the *motor plate* 30, at its base and it has an offset weight attached to its rotating shaft. All together items 12, 20, 30 and 40 combine to form the *elastomeric mixing platform* 50. A more detailed callout Fig. 1B is supplied to better illustrate the position of the *elastic bands* 12 as attached to the motor plate 30. The *power source* 60, is comprised of three each, C-Cell Batteries. The *electronic timer module* 70 comprises a printed circuit board with the necessary electronics to control mixing cycle time by virtue of controlling the current flow to the *motor* 40 after having received the appropriate start signal from the *cycle trigger assembly* “not shown” which comprises a *permanent magnet* fixed to the bottom of the *elastomeric mixing platform* 50, which when said motor plate is pressed in a downward direction, as it would be during the insertion of a bottle of fingernail polish, moves sufficiently close to a *magnetic reed switch* to cause said switch to close and send a current signal to the *electronic timer module* 70. The *base cover* 80 provides structural completion of the body and frame as well as a non-skid base foundation during mixing.

[028] The *bottle of fingernail polish 1*, is shown for illustrative purposes only and is not a part of the present invention. Wiring is not shown in the mechanical drawing but is assumed to be operational as described, such that those skilled in the art will fully appreciate and understand the functionality forthwith. Also not show is the optional battery eliminator and power jack which allows the unit to be operated by a standard household power source, for example 120V A-C 50/60Hz etc.

[029] Figure 2 is a wire-frame perspective illustration of the elastomeric mixing platform sub-assembly. Not show are the elastic bands illustrated in Fig. 1B. The *foam work piece holding device 210*, with the *specially shaped cutout 215*, is fixed to the *motor plate 220*. The *elastic band anchor points 230* are clearly visible in this illustration. The rear of the *motor 240*, is fixed to the *motor plate 220* with two screws and the *offset weight 250*, is press-fit onto the motor shaft. The upper rim and sides of the *foam work piece holding device* act as a physical travel limit and dampener during gyration or mixing.

[030] Figure 3 is a solid cut-away image illustrating the same components shown in Figure 1A, vertically sliced through near the center to allow for an assembled perspective and layout of said unit. The frame 310 with the internal ribs which have holes 311, cut out to allow for the mounting of the outer ends of the *elastic bands* to the frame body. The *foam work piece holding device 320*, fixed to the *motor plate 330*, which has also a counter weighted *motor 340*, attached to its base, the combination thereof when combined with the elastic mounting bands comprise the *elastomeric mixing platform sub-assembly*. Below said sub- assembly is shown, an area housing the *batteries 360*, the *electronic timer module 370*, and is structurally completed by the *unit base 380*.



**[031]** Figure 4 is a perspective view of a fully assembled unit and is presented to offer a clear image of an assembled unit. Parts showing are the outer *frame* 410 the top of the *work piece holding device* 420 and the outside of the *base* 480. For illustrative purposes only, and not a part of the current invention, a bottle of fingernail polish is shown properly loaded into the *work piece holding device* 420.

**[032]** It is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention. Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

**[033]** Although the present invention has been described with reference to preferred embodiments, persons skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.